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The North Carolina School of Science and Mathematics

Course Catalogue 1989 - 1990

Course Descriptions

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NCSSM COURSES

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The North Carolina School of Science and Mathematics

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INTRODUCTION

The course offerings described in the following pages have been developed for the 1989-1990 school year. They have been designed to provide both depth and breadth in the instructional program. Advanced studies are available in all the academic disciplines represented in the curriculum with particularly varied and challenging choices available in mathematics and the sciences. Every effort is made to accommodate the student's individual interests, with final decisions on any year's course offerings based on staff availability and satisfaction of minimum enrollment requirements.

The first consideration in building each student's course of study is to ensure a thorough grounding in mathematical, scientific, and communications skills and concepts. Students are urged to select an advanced sequence in at least one discipline in science and/or mathematics and also to sample other areas of study through their choice of electives. The objective is for students to learn enough about a variety of academic disciplines, in mathematics and the sciences and in other fields, to become informed decision makers and competent leaders in the technological world of the twenty-first century.

Each student has the opportunity to discuss course selections with the instructors and with faculty/staff advisors, the Guidance staff, and the Registrar, who work together to ensure the appropriateness of each student's program. Consideration is given to the student's academic background, interests, and ability, to personal growth, and to issues of college admission.

In order to address more fully the diverse needs, interests, and learning styles of a talented student population, the following credit-bearing study options and special programs are also provided: Independent Study, Individualized Study, and Seminar Studies. Mentor placements with faculty or other professional personnel in neighboring universities, colleges, museums, institutes, laboratories, or industries are arranged and supervised by the Mentor Program Coordinator, who is a member of the instructional staff.

The graduation requirements listed on the final pages specify that English and mathematics must be included in every student's program each semester and that juniors must be enrolled in two sciences and a foreign language. American history and literature are also required in the junior year. Each student is required to register for a minimum of five courses per semester.

Grade reports are issued to students and parents on a quarterly basis, and supplementary evaluations are sent when appropriate. The system of class rank is not used, since the school population is highly motivated and selected through a competitive admissions process. The following letter evaluation system is used and interpreted on school documents:

A - Outstanding achievement
B - Superior, meets all course requirements
C - Acceptable, minimally meets course requirements
D - Unsatisfactory, no NCSSM credit
I - Incomplete
S - Satisfactory
U - Unsatisfactory

Semester courses earn one-half unit of credit and year courses one full unit of credit. Partial credit is not granted. Additional information on registration procedures is included in the *Student Handbook.*

Provision is made for modifying a course schedule after the start of the academic year under specific guidelines also published in the *Student Handbook.*

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

Graduation Requirements in Mathematics

All students must successfully complete MA120 Introduction to College Mathematics, be enrolled in a mathematics course each semester, and successfully complete one unit of mathematics each year. Courses at the 200- level do not fulfill any of these mathematics requirements. Students must also demonstrate computer competency by taking a computer science course or by satisfying the guidelines for computer competency during the first semester of the junior year. Complete copies of these guidelines are distributed to all students when they register for their junior year.

Placement

Juniors are placed in the course best suited for them as determined by the Mathematics Department based on placement tests, previous background and interviews. Students who have not taken geometry are encouraged to take a course during the summer or to request an independent study in geometry. Geometry is not offered as a formal course.

Placement of seniors is determined by the mathematics courses they complete as juniors and by their performance in those courses. The department understands there are individual differences that need to be considered as students are placed in senior level courses.

Course Offerings

MA105 ALGEBRA. One year (1 unit of credit).

This junior level course reinforces the concepts in Algebra 1 and introduces the major topics in Algebra 2. The course emphasizes creating mathematical expressions, and the necessary manipulation of symbols within those expressions. Topics covered include the arithmetic of algebraic expressions; solving equations and inequalities in one variable; laws of exponents, radicals, and algebraic fractions; graphs of functions in two variables, including linear functions, quadratic functions, systems of linear equations, quadratic relations and functions; properties of logarithmic and exponential functions. In addition to the four regular class meetings, this course uses a lab period to address the special needs of the students enrolled.

MA110 ALGEBRA 2. One year (1 unit of credit).

This course is designed for those students who have not yet taken Algebra 2. The topics covered in the course include radicals, factoring and graphing polynomials, rational expressions, solution of linear and quadratic equations and inequalities, solutions to systems of equations, introduction to functions (including exponential, logarithmic, and trigonometric functions), conic sections, complex numbers, sequences, and series. Emphasis is placed on mathematics as a tool for problem solving and simple mathematical modeling.

MA112 ALGEBRA 3. One year (1 unit of credit).

Prerequisite: Algebra 2

This junior level course reviews and extends the concepts of Algebra 2 through the use of mathematical models involving functions. The course includes a comprehensive survey of linear, quadratic, exponential, and logarithmic functions. The instructor supplements this core with the selection of topics from polynomial and rational functions, systems of equations, complex numbers, sequences and series, and elementary probability and statistics. An effort is made throughout to motivate work on algebraic manipulations through the use of real-life situations.

MA115 ALGEBRA 2/INTRODUCTION TO COLLEGE MATHEMATICS. One year (1 unit of credit).

In this course the topics of Algebra 2 and Introduction to College Mathematics are presented to the student who has not previously taken Algebra 2. Since two courses are studied in one year, the pace of the course is fast. Topics are included from MA110 Algebra 2 and MA120 Introduction to College Mathematics.

MA120 INTRODUCTION TO COLLEGE MATHEMATICS. One year (1 unit of credit).

Prerequisite: Algebra 2 or Algebra 3

Mathematics is approached in innovative ways using the computer and calculator as tools. Applications drive the need to develop elementary functions that serve as a bridge between mathematics and the real world it models. The elementary functions studied are polynomial, exponential, logarithmic, and trigonometric. Additional techniques from matrices, probability, exploratory data analysis, algorithms and statistics aid in striving to describe real world phenomena. A graphical approach is emphasized throughout the course.

MA125 INTRODUCTION TO COLLEGE MATHEMATICS AND TOPICS. One year (1 unit of credit).

Prerequisite: Algebra 2 or Algebra 3

The topics and ideas of MA120 Introduction to College Mathematics are presented in greater depth and at a faster pace. Some topics are explored more extensively and additional topics are selected to supplement the course materials.

MA217 INTRODUCTION TO COMPUTING. One semester (1/2 unit of credit).

Students learn to use the computing facilities at NCSSM that will help them be successful students. Students learn to use an IBM PC and the VAX Minicomputer, be able to use PC Write and spreadsheets proficiently, and write a program in True BASIC. The course is graded Satisfactory/Unsatisfactory.

MA220 PROGRAMMING IN PASCAL. One semester (1/2 unit of credit).

The methodology of structured programming, especially stepwise refinement and top-down design, is emphasized through the use of the Pascal language. Language-independent features of Pascal, such as algorithms and data structures, are introduced. No prior programming experience is necessary. Students successfully completing this course may elect to take the AP Computer Science Level A Examination.

MA222 ALGORITHMS AND DATA STRUCTURES. One semester (1/2 unit of credit).

Prerequisite: MA220 Programming in Pascal or permission of the Mathematics Department

Based on the introductory work of Programming in Pascal, more advanced features of algorithms and data structures are studied with implementation through the Pascal language. Algorithms are studied with emphasis on iteration, recursion, divide -and -conquer, and efficiency. Data structures studied include linear data structures, tree structures, and other linked structures. Students successfully completing this course may elect to take the AP Computer Science Level AB Examination. The concepts in this course form the basis for additional study in computer science.

MA300 SURVEY OF FINITE MATHEMATICS. One semester (1/2 unit of credit).

Prerequisite: MA120 Introduction to College Mathematics or permission of the Mathematics Department

This course offers an overview of many topics, with the main emphasis on applications of mathematics in the social and management sciences, also known as the mathematics of human decision-making. Included are the topics of fair division of resources and costs, voting methods, apportionment of legislative bodies, power of voting coalitions, combinatorics, linear programming, and mathematical models using matrices. Students are expected to be involved in formulating problems, applying the appropriate mathematics to find a solution, and evaluating the solution. Computers and calculators are used frequently as computational and modeling aids.

MA302 NUMBER THEORY. One semester (1/2 unit of credit).

Prerequisite: MA120 Introduction to College Mathematics or permission of the Mathematics Department

Selected topics from elementary number theory are studied. They include divisibility properties of integers, special properties of prime numbers, congruences, Diophantine equations, Euler's Phi function and some applications to such fields as cryptography. Students with programming experience are encouraged to use this tool to investigate some of the ideas presented in the course. Students are encouraged to consider specific examples and then make a generalization. The concept of proof is developed over the semester. This course will not be offered every year.

MA312 STATISTICS. One semester (1/2 unit of credit).

Prerequisite: MA120 Introduction to College Mathematics or permission of the Mathematics Department

This course is designed to teach students to think statistically. Students are introduced to Exploratory Data Analysis and topics in experimental design, as well as to traditional descriptive and inferential statistics. Throughout the course, students use Minitab, a statistical computing system, and learn how statistics is used in education, political science, economics, medicine, and other fields. A final project requires each student to design an experiment or survey, carry out the process involved, and analyze the results.

MA314 STATISTICS WITH TOPICS. One semester (1/2 unit of credit).

Prerequisite: Permission of the Mathematics Department

This course is a faster paced and more in-depth study of the topics in MA312 Statistics. More emphasis is placed on the development of the mathematical underpinnings and theory of statistics. The focus of the course is on hypothesis testing and experimental design.

MA317 CALCULUS OF A SINGLE VARIABLE 1. One semester (1/2 unit of credit).

Prerequisite: A or B average in MA120 Introduction to College Mathematics or permission of the Mathematics Department

This course provides a rigorous study of first semester college calculus. Topics include limits, differentiation, integration, curve sketching, and other applications of differentiation.

MA318 CALCULUS OF A SINGLE VARIABLE 2. One semester (1/2 unit of credit).

Prerequisite: MA317 Calculus of a Single Variable 1 or MA321 Calculus of a Single Variable With Topics 1

This course provides a rigorous study of second semester college calculus. Topics include physical applications, methods of integration, transcendental functions, indeterminate forms, improper integrals, polar coordinates, infinite series, and an introduction to ordinary differential equations. Students may elect to take the Calculus BC Advanced Placement Examination.

MA321 CALCULUS OF A SINGLE VARIABLE WITH TOPICS 1. One semester (1/2 unit of credit).

Prerequisite: Permission of the Mathematics Department

This course is a faster paced and more in-depth study of the topics in MA317 Calculus of a Single Variable 1. Topics outside of the usual calculus curriculum are also included.

MA322 CALCULUS OF A SINGLE VARIABLE WITH TOPICS 2. One semester (1/2 unit of credit).

Prerequisite: Permission of the Mathematics Department

This course is a faster paced and more in-depth study of the topics in MA318 Calculus of a Single Variable 2. Topics outside of the usual calculus curriculum are also included. Students may elect to take the Calculus BC Advanced Placement Examination.

MA330 INTRODUCTION TO PROBLEM SOLVING. One semester (1/2 unit of credit).

Prerequisite: Permission of the Mathematics Department

The goal of this course is to assist students in becoming better problem solvers in a wide variety of situations. The course begins with a review of traditional topics and standard problem-solving techniques. A concerted effort is made to fill in gaps in the students' background. Problem solving cannot be done in a vacuum; consequently, students develop a tool kit of facts and techniques to use in solving problems, proving relationships, and posing their own problems. This course will not be offered every year.

MA405 CALCULUS OF SEVERAL VARIABLES. One semester (1/2 unit of credit).

Prerequisite: MA318 CALCULUS OF A SINGLE VARIABLE 2

This course includes vector analysis, partial differentiation, multiple integrals, and line and surface integrals. Numerical approximations such as Simpson and trapezoidal methods for volumes, Taylor polynomials in two variables, and gradient search methods for constrained optimization are discussed.

MA410 TOPICS IN DISCRETE MATHEMATICS. One semester (1/2 unit of credit).

Prerequisite: Permission of the Mathematics Department

This course offers students an opportunity to study topics from outside the calculus-based sequence of mathematics. Content is drawn from the areas of analysis of algorithms, optimization, game theory, graph theory, and combinatorics. The topics covered are highly challenging, and both strong interest and talent in mathematics are required for success in the course. Students are required to research and present to the class a topic related to the content of this course. This course will not be offered every year.

MA415 TOPICS IN MODERN ALGEBRA AND APPLICATIONS. One semester (1/2 unit of credit).

Prerequisite: Permission of the Mathematics Department

The purpose of this course is to give advanced students an opportunity to study topics not usually offered in a high school curriculum. The course covers topics such as groups, rings, fields, and integral domains. The particular topics and time spent on them varies with the instructor and student interest. Whenever possible, the course attempts to address the applications of algebraic structures to the sciences, business, statistics, and decision making. This course will not be offered every year.

MA417 MATHEMATICAL MODELING. One semester (1/2 unit of credit).

Prerequisite: Permission of the Mathematics Department

Advanced students are introduced to the creative and analytic aspects of modeling real-world phenomena. Models from engineering, biology, political science, management science, and everyday life are examined through a variety of techniques. When presented with a situation, students learn to propose, test, and revise an appropriate model. The course is project oriented and group work is encouraged.

MA420-421 ADVANCED MATHEMATICAL TOPICS. One semester (1/2 unit of credit).

Prerequisite: Permission of the Mathematics Department

This course offers an opportunity for students with an especially strong background in mathematics to pursue a rigorous study of a topic outside the standard curriculum. The topic chosen may be in mathematics or a mathematical study of another field. Students are expected to make formal presentations and to write a paper on the topic. This course is designed for students who have exhausted the other course offerings in mathematics.

MA425 FRACTALS AND CHAOTIC SYSTEMS. One semester (1/2 unit of credit).

Prerequisite: Permission of the Mathematics Department and programming experience

This course will investigate fractals, how fractals are generated, applications of fractals to realistic phenomena, and the underlying mathematical theory of fractals. The related field of chaotic systems will also be studied. Fractals and chaos defy classical mathematical description, so the use of computer simulations will be an important part of the course. The topics in this course constitute recent discoveries in mathematics; therefore, students must possess the desire and the sophistication to work at the cutting edge of mathematical research. This course will not be offered every year.

DEPARTMENT OF SCIENCES

The aim of the Department of Sciences at the North Carolina School of Science and Mathematics is to give all students an introduction to each of the basic sciences (biology, chemistry, physics) and to allow them to pursue their particular interests by taking elective courses in areas of their choice. To meet graduation requirements in science, a student must complete three units of science while in residence at the North Carolina School of Science and Mathematics and show competence in each of the three sciences, either by passing an introductory course or by taking a test to be exempted from the first course. A student exempted from a course must still complete three units of science credit by adding either an advanced course or other science electives.

Each of the sciences has a test available at the beginning of the year to allow students to be exempted from introductory courses. By passing the test a student is able either to advance immediately to a higher level course in this area or to spend the time in other science courses which might be of more interest.

Biology

Graduation Requirement in Biology

The graduation requirement in biology may be fulfilled by:

1. exemption by an examination given during the opening of the fall semester and the recommendation of the North Carolina School of Science and Mathematics biology faculty; OR

2. a year-long biology course (BI250 Research in Biology or BI260 Survey of Advanced Biology); OR

3. sucessful completion of a combination of semester biology courses in the 100 and/or 200 series totaling one unit of credit. (Note: The electives BI304 Biophysics, BI305 Bioethics, BI307 Science of the Mind cannot be used to meet the graduation requirement in biology.)

Placement

An incoming student who has had little or no previous high school biology will enroll in BI105 Chemistry, Form and Function in Biological Systems or BI260 Survey of Advanced Biology, depending on the level of preparation in science and interest in preparing for the Biology Advanced Placement Examination.

Students who have had a year of high school biology before coming to the North Carolina School of Science and Mathematics usually enroll in a 200 level course.

Course Offerings

BI105 CHEMISTRY, FORM AND FUNCTION IN BIOLOGICAL SYSTEMS. One semester (1/2 unit of credit).

This course examines the molecular bases of cell structure and function, energy transformations in cells, and animal/plant systems and their methods of control. Students use a variety of learning techniques during the semester, and enrichment activities such as computer simulations and field trips supplement the course material. Laboratory work is a major emphasis throughout the course.

BI106 HEREDITY AND DIVERSITY OF ORGANISMS. One semester (1/2 unit of credit).

This course examines cell reproduction, observable patterns of inheritance, molecular genetics and human genetics during the first part of the semester. In the second part, students develop concepts of biological classification, evolution and ecology. Students use a variety of learning techniques, as well as enrichment activities such as computer simulations and field trips. Laboratory work is a major emphasis throughout the course.

BI205 CELL BIOLOGY AND BIOCHEMISTRY. One semester (1/2 unit of credit).

This course examines cellular structure and function common to most eucaryotic cells. Topics covered include cellular components, cell movement and membrane function, energetics, protein synthesis, and enzyme function. In the second half of the course basic biochemical principles of carbohydrates, lipids and proteins are explored. Students are expected to extend these principles to group projects.

BI208 ANATOMY AND PHYSIOLOGY. One semester (1/2 unit of credit).

This course focuses on the structure and function of the systems of the human body. Topics of study include cells, tissues, organs and organ systems. Dissection is a part of the anatomy laboratory work. Students also perform a variety of physiology experiments as part of the study of each system. Field trips and speakers supplement the course.

BI212 HUMAN PHYSIOLOGY. One semester (1/2 unit of credit).

Prerequisite: BI205 Cell Biology and Biochemistry or BI216 Anatomy and Physiology or permission of the instructor

This course is an extension of the basic concepts and principles presented in BI205 and BI208. Emphasis is placed on practical applications of human physiology in areas such as cardiovascular physiology, neurophysiology, exercise physiology, nutrition in health and disease, and aging. Laboratory activities are emphasized and students have access to physiological instrumentation. Field trips to examine biological technology and its relation to medicine supplement the class.

BI215 BEHAVIOR OF PLANTS AND ANIMALS. One semester (1/2 unit of credit).

Response to stimuli is a characteristic of all living things. These responses (behaviors) are examined as well as the physiology involved in the responses. Organisms as varied as protozoa, plants and humans, and behaviors as varied as parenting, food-getting and defense are studied.

BI218 BIOLOGY OF PLANTS AND ANIMALS. One semester (1/2 unit of credit).

This course begins with the fundamentals of plant and animal diversity and an overview of classification. It then progresses to a study of the biology of specific plants and animals. Topics include physiology, anatomy, ecological relationships and reproductive behaviors. During the second half of the course emphasis is on field work and student-designed research. Students work in several local habitats including streams, ponds and fields. There is one optional weekend trip to the North Carolina coast or mountains.

BI221 GENETICS. One semester (1/2 unit of credit).

The course begins with the fundamentals of cell division. It then traces the development of genetics from the pea plants of Mendel, through the double helix model of Watson and Crick, to the current topics of gene regulation and recombinant genetics. Laboratory activities and critical thinking skills are heavily emphasized; students are expected to develop their own theories of gene regulation and design some of their own laboratory experiments. Field trips, video tapes and outside speakers supplement the course.

BI224 EMBRYOLOGY AND EVOLUTION. One semester (1/2 unit of credit).

This course explores the development of vertebrates as individual organisms and as a subphylum. Fish, amphibians and birds are used as specific examples of embryology. The evolution of all kinds of life is studied with particular emphasis on vertebrates and humans.

BI227 HUMAN GENETICS, DEVELOPMENT AND IMMUNOLOGY. One semester (1/2 unit of credit).

Prerequisite: BI221 Genetics or BI224 Embryology and Evolution or permission of the instructor

This course extends concepts and provides new information on topics from BI221 Genetics and BI224 Embryology and Evolution. Emphasis is on recent advances in such fields as genetic predisposition to certain diseases, genetically engineered products in medicine, regulation of gene expression during development and the genetics and development of the immune response during prenatal and postnatal life. Some laboratory time is spent on field trips to facilities that are performing research and making use of advances in these fields.

BI233 ECOLOGY. One semester (1/2 unit of credit).

The course begins with concepts including population regulation, the "niche", competition, predation, ecological energetics, diversity and biogeochemical cycles. Laboratory activities are used extensively to demonstrate and extend these concepts. During the second half of the course, the emphasis shifts to field activities. Terrestrial and aquatic habitats are visited and studied. The course concludes with the ecology of man. During this portion students use ecological concepts to study man's relationship to his environment and develop their own positions concerning several current environmental issues.

BI235 DEVELOPMENT, STRUCTURE AND FUNCTION OF HUMAN REPRODUCTIVE SYSTEMS. One semester (1/2 unit of credit).

In this course the anatomy of human reproductive systems is studied, together with their hormonal regulation. Modern technologies related to conception, pregnancy and childbirth are examined. Laboratory activities are performed showing the development of several vertebrate embryos.

BI237 ORIGINS AND RESPONSES OF HUMAN REPRODUCTIVE SYSTEMS. One semester (1/2 unit of credit).

This course begins with a study of cellular reproduction, oogenesis and spermatogenesis. Genetic determinants of gender and brain sex are studied. Other topics examined include mate selection, developmental abnormalities and sexually transmitted diseases.

BI250 RESEARCH IN BIOLOGY. One year (1 unit of credit).

Prerequisite: Adequate score on biology placement examination and permission of the instructor

This course is designed to allow students to pursue individual research problems in biology. Students learn to use library resources, gain experience in scientific writing, receive closely supervised training in techniques commonly used in research and receive instruction in laboratory safety and proper experimental design. Each student designs and carries out a research project under the supervision of the instructor. Students are encouraged to enter their projects in regional and national research competitions. This course is open to both juniors and seniors; juniors are particularly encouraged to enroll.

BI260 SURVEY OF ADVANCED BIOLOGY. One year (1 unit of credit).

Prerequisite: Adequate score on the biology placement examination and permission of the instructor

This course is a survey of the field of biology. Lecture is kept to a minimum. Emphasis is placed on open-ended laboratory experiments and student involvement. Students who master content material will be prepared for the Biology Advanced Placement Examination.

BI304 BIOPHYSICS. One semester 1/2 unit of credit).

Prerequisite: One semester of biology; one semester of PH105 Physics or PH107 Physics and Topics

This course explores a variety of biological systems and questions from the point of view of physics. Examples are drawn from such areas as mechanics (bone and muscle strength and elasticity), the properties of fluids (air and blood circulation), electromagnetism (magnetism and bird navigation) and others. Biotechnological advances are discussed where relevant.

BI305 BIOETHICS. One semester (1/2 unit of credit; 1/4 each in biology and social science).

In this course students consider the ethical questions arising from discoveries of modern biology, including genetic counseling, genetic engineering, in vitro fertilization, medical research, transplants, euthanasia and other issues.

BI307 SCIENCE OF THE MIND. One semester (1/2 unit of credit).

Prerequisite: One semester of biology and one year of chemistry or physics, all taken at NCSSM, or permission of the instructor

This is an interdisciplinary course that explores the biology, chemistry and physics of the mind as well as engineering applications such as artificial intelligence and neural network design. Topics include the anatomy and functional organization of the brain, memory and knowledge, emotion and motivation, sleep and dreaming, language and thought, information and meaning, and sensation and perception.

Chemistry

Graduation Requirement in Chemistry

The graduation requirement in chemistry may be fulfilled by:

1. exemption by the American Chemical Society High School Chemistry Standardized Examination given during the opening of fall semester and the recommendation of the North Carolina School of Science and Mathematics chemistry faculty; OR

2. a year of CH105 General Chemistry, CH110 General Chemistry and Topics, or CH205 Advanced Chemistry at the North Carolina School of Science and Mathematics. This graduation requirement is not fulfilled by CH305 Organic Chemistry, CH307 Environmental Chemistry, CH310 Chemical Instrumentation, CH315 Polymer Chemistry or CH320 Biochemistry.

Placement

An incoming student who has had little or no previous chemistry usually enrolls in either CH105 General Chemistry or CH110 General Chemistry and Topics depending on the level of preparation in mathematics and science and interest in preparing for the Advanced Placement Chemistry Examination by taking only a single year of chemistry.

An incoming student who has had a year of chemistry before coming to the North Carolina School of Science and Mathematics usually enrolls in CH205 Advanced Chemistry. Juniors enrolling in this course are given a test to ensure proper placement.

Course Offerings

CH105 GENERAL CHEMISTRY. One year (1 unit of credit).

This introductory course presents the basic principles of chemistry in a manner that is understandable to the beginning student. Classroom and laboratory time is devoted to the development of insight into such basic concepts as atomic theory, chemical bonding, molecular structure, chemical thermodynamics, kinetic theory and chemical equilibrium.

CH110 GENERAL CHEMISTRY AND TOPICS. One year (1 unit of credit).

Co-requisite: MA115 Algebra 2/Introduction to College Mathematics or higher mathematics

This is a rigorous introductory course that, like CH105 General Chemistry, covers the basic principles of chemistry. The course uses an advanced general chemistry text and moves at a faster pace than CH105, thereby covering additional topics and treating many areas in greater depth. The course is intended primarily for students who wish to prepare for the Advanced Placement Chemistry Examination by taking only a single year of chemistry.

CH205 ADVANCED CHEMISTRY. One year (1 unit of credit).

Prerequisite: CH105 General Chemistry, CH110 General Chemistry and Topics or permission of the instructor

This course is designed for students who have taken an introductory chemistry course before coming to the School, and also serves as a continuation of either CH105 General Chemistry or CH110 General Chemistry and Topics. It is especially recommended for those who wish to prepare for the Advanced Placement Chemistry Examination.

CH305 ORGANIC CHEMISTRY. One semster (1/2 unit of credit).

Prerequisite: CH105 General Chemistry or higher chemistry or permission of the instructor

This course introduces topics on the structure and synthesis of organic compounds. Special emphasis is given to biologically important organic compounds. The laboratory involves isolation, analytical and synthetic techniques. Instrumental techniques such as infrared and nuclear magnetic resonance spectrometry are used.

CH307 ENVIRONMENTAL CHEMISTRY. One semester (/2 unit of credit).

Prerequisite: CH105 General Chemistry or higher chemistry and permission of the instructor

This course introduces chemistry-related topics of environmental concern including atmospheric chemistry, acid rain, the chemistry of natural water systems, water pollution and water treatment. Laboratory activities include field and sampling trips and analytical methods for monitoring pollutants.

CH310 CHEMICAL INSTRUMENTATION. One semester (1/2 unit of credit).

Prerequisite: CH105 General Chemistry or higher chemistry and permission of the instructor

Co-requisite: MA120 Introduction to College Mathematics or higher mathematics

This course introduces students to several instrumental methods used to make measurements on chemical systems. Classroom presentation and discussion of the fundamental principles underlying each instrumental measurement method is followed by practical laboratory experience using those instruments. Methods for which instruments are currently available include chromatographic separations (e.g., gas-liquid partition chromatography and high-performance liquid chromatography), ultraviolet-visible spectrophotometry and electrochemistry. Instrumentation for other methods is available and may be included as time permits.

CH315 POLYMER CHEMISTRY. One semester (1/2 unit of credit).

Prerequisite: Full year of chemistry and permission of the instructor

This course is an introduction to polymer science. The scope of the course includes the chemistry, physical properties, synthesis and characterization of polymers.

CH320 BIOCHEMISTRY. One semester (1/2 unit of credit).

This is an introductory course intended to acquaint the student with the chemistry of biomolecules and metabolic pathways. Biomolecules considered include water, amino acids, peptides, proteins, enzymes, carbohydrates, lipids, vitamins and coenzymes. Metabolic pathways presented include a survey of intermediary metabolism, glycolysis, uric acid cycle, electron transport and oxidation of fatty acids.

Physics

Graduation Requirement in Physics

The graduation requirement in physics may be fulfilled by:

1. exemption by a standardized examination given during the opening of fall semester and the recommendation of the North Carolina School of Science and Mathematics physics faculty; OR

2. a year of PHl05 Physics, PHl07 Physics and Topics, or PH210 Advanced Physics at the North Carolina School of Science and Mathematics.

Placement

An incoming student who has had little or no previous physics enrolls in PH105 Physics or PH110 Physics and Topics depending on the level of preparation in mathematics and science.

Students who have had a year of physics before coming to the North Carolina School of Science and Mathematics and who want to enroll in PH210 Advanced Physics may do so with permission of the physics faculty.

Course Offerings

PH105 PHYSICS. One year (1 unit of credit).

This course provides a sound, algebra-based foundation in the principles of classical physics. The first semester covers the laws of mechanics and their applications. The second semester covers wave motion and the laws of electricity and magnetism. Throughout both semesters, topics in modern physics are included where appropriate.

PH107 PHYSICS AND TOPICS. One year (1 unit of credit).

Co-requisite: MA115 Algebra 2/Introduction to College Mathematics or higher mathematics

This course covers the topics of PH105 Physics but in greater depth and at a faster pace. It has a greater mathematical emphasis than PH105 and uses a more advanced text.

PH210 ADVANCED PHYSICS - MECHANICS. One semester (1/2 unit of credit).

Prerequisite: PH105 Physics or PH107 Physics and Topics or permission of the Physics faculty

Co-requisite: MA317 Calculus of a Single Variable 1 or higher mathematics

This course provides a rigorous treatment of classical mechanics for students who have a familiarity with the concepts of mechanics from an earlier course. Calculus is used where appropriate in problem solving and derivations. When time permits, other topics may also be covered, chosen from Lagrangian dynamics, heat and thermodynamics, fluid dynamics and relativity. This course may be used to prepare for the Mechanics portion of the Advanced Placement Physics C Examination.

PH211 ADVANCED PHYSICS - ELECTROMAGNETIC THEORY. One semester (1/2 unit of credit).

Prerequisite: PH105 Physics or PH107 Physics and Topics or permission of the Physics faculty

Co-requisite: MA317 Calculus of a Single Variable 1 or higher mathematics

This course provides an introduction to the theory of electromagnetism as synthesized by Maxwell. Topics include Gauss's Law, conservative fields, electric circuits, Ampere's Law, electromagnetic induction, electromagnetic devices and Maxwell's equation. Calculus is used where appropriate in problem solving and derivations, and the necessary vector calculus is introduced to allow understanding and use of Maxwell's equations. When time permits, other topics may also be covered, chosen from optics, wave motion and quantum mechanics. This course may be used to prepare for the Electricity and Magnetism portion of the Advanced Placement Physics C Examination.

PH315 APPLIED ELECTRONICS. One semester (1/2 unit of credit).

The emphasis of this course is on the practical application of electronics. Students begin by learning about basic electronic circuits and then use solderless breadboards to build and use these circuits in a variety of ways. The course is graded Satisfactory/Unsatisfactory.

PH325 ASTROPHYSICS. One semester (1/2 unit of credit).

Co-requisite: PH105 Physics or PH107 Physics and Topics; MA115 Algebra 2/Introduction to College Mathematics or higher mathematics

This course emphasizes the origin, structure and evolution of stars, interstellar matter, galaxies and the universe. Many physical and chemical principles are integrated into the study of both stellar and galactic structure and evolution. Opportunities for telescope observation and projects are available.

PH330 SOLAR SYSTEM. One semester (1/2 unit of credit).

Prerequisite: PH105 Physics or PH107 Physics and Topics

This course emphasizes the origin, structure and evolution of the solar system and its contents, including planets, moons, comets, asteroids and meteors. Other topics of discussion include time and sundials, the origin of life on earth and and the possible existence of nature and life elsewhere in the universe. Opportunities for telescope observations and projects are available.

PH340 MODERN PHYSICS. One semester (1/2 unit of credit).

Prerequisite: PH105 Physics or PH107 Physics and Topics or permission of instructor

Co-requisite: MA115 Algebra 2/Introduction to College Mathematics or higher mathematics

This course surveys the physics developed during this century. Topics are selected from special and general relativity, atomic and nuclear structure, particle-wave duality, quantum mechanics, elementary particles and grand unified theories.

PH345 ADVANCED MODERN PHYSICS. One semester (1/2 unit of credit).

Prerequisite: PH105 Physics or PH107 Physics and Topics or permission of instructor

Co-requisite: MA317 Calculus of a Single Variable 1 or higher mathematics

This course covers the same concepts as PH340 Modern Physics but uses calculus derivations for several classical physics models: the quantum mechanical Schroedinger solution for the particle-in-the-box problem, the harmonic oscillator, and electron probability distributions for the hydrogen atom.

Note: See also in biology the course description of BI304 Biophysics which grants 1/4 unit of credit in physics.

DEPARTMENT OF HUMANITIES

The course offerings in the Department of Humanities attempt to sharpen students' decision-making and communications skills, enlarge students' understanding of their own culture and other cultures, and increase their appreciation of major art forms in an intellectual and applied context. The Department offers each student an opportunity to select from a variety of required and elective courses.

Art

Course Offerings

AR105 ART APPLICATIONS. One semester (1/2 unit of credit).

This course exposes students to four valuable art skills in one semester. Drawing in pencil and pen & ink introduces students to concepts of right brain stimulation, seeing and analyzing reality, and interpreting reality by using abstract expression to respond to their personal feelings. All sections of the course start out with this foundation and then proceed to a varying sequence of three more skills.

Screen printing is used to apply drawing skills to a major printmaking technique and to provide an avenue for creative self-expression through the use of symbols.

The medium of photography exposes students to concepts of physics and chemistry while giving them an opportunity to examine their physical environment and make emotional statements along selected themes. The use of a 35mm camera, developing film and making prints on paper are covered.

Activities in ceramics give students opportunities to learn about three dimensional expression in both utilitarian objects and in expressive sculpture.

AR110 MECHANICAL DRAWING. One semester (1/2 unit of credit).

This course provides in-depth training in drawing to students considering careers in engineering and architecture and for those students desiring ways to make themselves more effective in visually communicating technical information in any profession. The goal of this individually paced course is to master engineering and technical drawing tools. Computer-aided design is made available to those wishing to pursue independent work.

AR205 ADVANCED PHOTOGRAPHY. One semester (1/2 unit of credit).

Prerequisite: Prior photography experience; AR105 Art Applications strongly recommended

This course is designed to provide the experienced photographer with advanced darkroom, studio, and in-the-field skills. Color photography is introduced. Class begins with formal instruction and evolves toward independent student work.

AR210 ADVANCED MECHANICAL DRAWING. One semester (1/2 unit of credit).

Prerequisite: AR110 Mechanical Drawing

This advanced course emphasizes product design, assembly drawing, and exploded views. Architectural drafting is introduced with emphasis on floor plans, site plans, elevations, perspective drawing, exterior and interior building details, and the development of a personal lettering style. The final project is an original design of a building, space, or functional object complete with all drawings necessary for its construction. Students learn the basics of computer-aided design through the use of AutoCAD software.

English

Senior English: Each student is required to earn 1/2 unit of credit in English during each semester of the senior year. In at least one of these semesters the student must be enrolled in a literature course.

Junior English: Juniors are required to enroll in EN105 Writing and American Literature.

Course Offerings

EN105 WRITING AND AMERICAN LITERATURE. One year (1 unit of credit).

This course provides students with the opportunity to develop writing skills while studying major works of American literature. The writing study seeks to develop and enhance skills of communication and expression of ideas. The literary study focuses on the uniquely American characteristics of these works, their larger thematic implications, and their artistic merit.

EN205 BRITISH LITERATURE. One semester (1/2 unit of credit).

Students survey the literature of England from the beginning to 1600. Students continue to develop and practice skills in composition and rhetoric introduced in the junior year, through various analytical, expository, appreciative, and creative assignments.

EN206 BRITISH LITERATURE. One semester (1/2 unit of credit).

This course is a survey of the literature of England from 1600 to the present. Special attention is given to major writers and to works of each period. Students continue to develop and practice skills in composition and rhetoric introduced in the junior year, through various analytical, expository, appreciative, and creative assignments.

EN210 ADVANCED WRITING. One semester (1/2 unit of credit).

In this course students continue to study examples of expository, argumentative, technical, and creative writing. Students are expected to produce work in several of these types and are encouraged to do additional work in those areas which most interest them.

EN305 WISDOM, REVELATION, REASON, AND DOUBT. Interdisciplinary one-semester one-credit course for seniors (1/2 unit of credit in English; 1/2 unit of credit in social science).

This course integrates the political, cultural, social and intellectual history of the ancient, classical and medieval Western World with the study of literature and the visual arts. Students read, discuss and write about literary and historical materials.

EN306 WISDOM,REVELATION, REASON, AND DOUBT. Interdisciplinary one-semester one-credit course for seniors (1/2 unit of credit in English; 1/2 unit of credit in social science).

This course integrates the political, cultural, social and intellectual history of the modern Western World from the Renaissance with the study of literature and the visual arts. Students read, discuss and write about literary and historical materials.

EN310 AFRICA, ASIA, LATIN AMERICA: LITERATURE AND HISTORY. Interdisciplinary one-semester, one-credit course for seniors (1/2 unit of credit in English; 1/2 unit of credit in social science).

In this course students examine the history and literature of selected countries in both Africa and Latin America. The course focuses primarily on contemporary writers and on twentieth-century history.

EN311 AFRICA, ASIA, LATIN AMERICA: LITERATURE AND HISTORY. Interdisciplnary one-semester, one-credit course for seniors (1/2 unit of credit in English; 1/2 unit of credit in social science).

In this course students examine the history and literature of selected countries in the Middle East and Asia. The course focuses primarily on contemporary writers and on twentieth-century history.

EN315 TOPICS IN LITERATURE. One semester (1/2 unit of credit).

Students participate in a series of intensive, small-group studies, each emphasizing a major genre or period. Enrollment is limited to twenty seniors, recommended by their first-semester senior English instructors for an aptitude toward independent work.

Foreign Languages

Every student must enroll in a foreign language during the junior year. Students who can prove competency by testing at the completion level of the third year of a foreign language may consult the Department Head for a modification of this requirement. Note: Any student who begins a new foreign language in the junior year must continue that language in the senior year, regardless of prior foreign language credits.

Course Offerings

FR105 INTRODUCTORY FRENCH. One year (1 unit of credit).

Emphasis in this course is placed on the acquisition of basic language skills: speaking, listening, comprehension, reading, and writing. The student acquires a base vocabulary and learns the simple grammatical constructions needed for essential communication. Cultural aspects of the people are also introduced.

FR205 INTERMEDIATE FRENCH. One year (1 unit of credit).

While emphasis on basic language skills is continued, the student's competency in the language is further increased by (1) reading short texts, (2) oral discussion of material read by the class, (3) greater use of the language in everyday conversational situations, and (4) creative expression which may take the form of written compositions, oral reports, and short skits. Most of the grammatical constructions are learned.

FR305 ADVANCED FRENCH. One year (1 unit of credit).

Prerequisite: Two years of prior study of French

This course continues development of skills in oral, written, and aural French. The fine points of grammar, complex verb tenses, and idiomatic expressions are treated in depth, with emphasis on using these structures in composition and conversation. *Le Petit Prince* and a variety of literary excerpts are read and combined with culture units on French-speaking countries.

FR405 ADVANCED FRENCH LITERATURE. One year (1 unit of credit).

Prerequisite: Three years of prior study of French

This course examines an extensive list of sixteenth through twentieth century French literary masterpieces in a variety of genres. Students are expected to acquire skills in French literary analysis, discussion, and composition. This class prepares students to take the Advanced Placement French Literature Examination in May.

GE105 INTRODUCTORY GERMAN. One year (1 unit of credit).

Emphasis in this course is placed on the acquisition of basic language skills: speaking, listening, comprehension, reading, and writing. The student acquires a base vocabulary and learns the simple grammatical constructions needed for essential communication. German culture is also introduced. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

GE205 INTERMEDIATE GERMAN. One year (1 unit of credit).

Emphasis on basic language skills begun in German 1 is continued. The student's competency in the language is further increased by the reading and discussion of short texts. The more complex grammatical constructions are learned and practiced. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

GE305 ADVANCED GERMAN. One year (1 unit of credit).

Prerequisite: Two years of prior study of German

The student continues development of skills in oral, aural, and written German. A systematic review of grammar is conducted with emphasis placed on the fine points not covered in levels one and two. Reading modern short stories, poems, and one full-length play serves as an introduction to German literature, and frequent compositions require the students to synthesize what they have learned. Tapes, films, and videotapes aid in advancing listening comprehension skills as well as providing information on German culture.

LA105 INTRODUCTORY LATIN. One year (1 unit of credit).

Students gain mastery of the essentials of Latin grammar, with particular emphasis on English derivatives and vocabulary building. Cultural aspects of the Greek and Roman world are also introduced. Attention is given to development of translation skills. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

LA205 INTERMEDIATE LATIN. One year (1 unit of credit).

Review and further study of the essentials of Latin grammar are stressed. Increased emphasis is placed on reading and translation of ancient authors (Petronius, Caesar) and on English vocabulary and stylistics. Elements of Roman history are also introduced.

LA305 ADVANCED LATIN PROSE. One year (1 unit of credit).

Prerequisite: Two years of prior study of Latin

A systematic review of all Latin grammar is conducted. Emphasis is on reading and analyzing classical authors (Cicero,Pliny,Plautus) and their cultural environment. Students are introduced to supplementary areas of classical studies (religion, art and history, among others). (Offered in 1989-90).

LA307 ADVANCED LATIN POETRY. One year (1 unit of credit).

Prerequisite: Two years of prior study of Latin

A systematic review of all Latin grammar is conducted, and students are introduced to Latin poetry. Emphasis in the course is on reading and analyzing fables from Phaedrus, poems from Catullus and Horace, excerpts from the *Metamorphoses* of Ovid, and the *Aeneid* of Vergil. Basics of Latin scansion are studied. (Offered in 1990-91).

RU105 INTRODUCTORY RUSSIAN. One year (1 unit of credit).

This course is an introduction to the Russian language with emphasis on conversation, reading, writing, and acquisition of the basic grammatical constructions. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

RU205 INTERMEDIATE RUSSIAN. One year (1 unit of credit).

In this course, students continue acquisition of the basic grammatical elements of the language with increased emphasis on vocabulary building and oral self-expression. Filmstrips are used for cultural enrichment and aural comprehension. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

SP105 INTRODUCTORY SPANISH. One year (1 unit of credit).

Emphasis in this course is placed on the acquisition of basic language skills: speaking, listening, comprehension, reading, and writing. The student acquires a base vocabulary and learns the simple grammatical constructions needed for essential communication. Cultural aspects of the people are also introduced. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

SP205 INTERMEDIATE SPANISH. One year (1 unit of credit).

While emphasis on basic skills is continued, the student's competency in the language is further increased by (1) reading short texts, (2) greater use of the language in everyday conversational situations, (3) oral discussion of material read by the class, and (4) creative expression which may take the form of written compositions, oral reports, and short skits. Most of the grammatical constructions are learned. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

SP305 ADVANCED SPANISH. One year (1 unit of credit).

Prerequisite: Two years of prior study of Spanish

In this course reading selections of increasing difficulty from literature and culture form the basis for study and discussion by the class. The more complex grammatical constructions of the language are studied and reviewed. Filmstrips are used as a vehicle for cultural enrichment, vocabulary building, and grammar review. Oral and written reports are also used as a means of sharpening the student's skills in the language. Computer drills are available to aid students in the acquisition of grammatical concepts and new vocabulary.

SP405 ADVANCED SPANISH LITERATURE. One year (1 unit of credit).

Prerequisite: Three years of prior study of Spanish

Students in this course study Spanish and Latin American literature in various genres and from various time periods. This reading serves as a basis for compositions and for discussions conducted in Spanish.

History and Social Sciences

Junior requirement: each junior is required to complete one year in Advanced American Studies for one full unit of graduation credit. The student may select one of the following two courses:

1. SS105 American Society: History and Culture OR
2. SS110 American History: Critical Issues

Each of the courses described below contains a Strategies in Learning component, which is designed to enhance students' abilities to communicate in various forms. Emphasis is placed on research, writing, reading, oral, visual, map, computer, and decision-making skills.

Students who have had an American History course in the tenth grade must preregister for one of the above options and may, upon arrival, consult the Department Head for consideration of alternative placement for social science credit.

Course Offerings

SS105 AMERICAN SOCIETY: HISTORY AND CULTURE. One year (1 unit of credit).

This course traces the development of the United States from 1607 until the present in chronological sequence. Emphasis is placed on social, political, economic, and cultural trends.

SS110 AMERICAN HISTORY: CRITICAL ISSUES. One year (1 unit of credit).

This course examines critical interpretive issues in American history from the colonial era to the present. The rigorous approach combines a narrative chronology of American development with an indepth examination of ongoing problem areas in American life such as race relations, war and society, reform movements, the importance of ideas, government intervention in individuals' lives, and the nature of the modern political economy.

SS205 ECONOMICS: MONEY, MANAGEMENT, AND MARKETS. One semester (1/2 unit of credit).

Co-requisite: MA120 Introduction to College Mathematics or higher mathematics

This introductory course in economics provides students a significant opportunity to apply the techniques and learnings of mathematics and science to social problems. The course is a study of theories and institutions that organize and direct the economic activities of mankind. It is designed to help the student understand basic economics and the problems on which he or she will have to pass judgment.

SS210 WORLD RELIGIONS. One semester (1/2 unit of credit).

This course examines the major religions of the world, their historical roots, course of development and present status. Emphasis is placed on the influence of each religion on modern thought, culture and politics as well as its interface with philosophy.

SS215 HISTORY OF SCIENCE AND TECHNOLOGY. One semester (1/2 unit of credit).

This course traces the basic development in scientific thought from the earliest time to the present. Beginning with "magic" as mankind attempts to deal with the mysteries of the universe, the course proceeds to discuss major scientific thinkers and inventors. Emphasis is placed on the societal context in which these developments occurred.

SS220 PSYCHOLOGY. One semester (1/2 unit of credit).

This introductory course deals with man as an individual and as a member of society. Emphasis is placed on such areas as the development of personality, abnormal behavior, intellect vs. intelligence, socialization, social systems, and social interaction.

SS225 INTERNATIONAL RELATIONS. One semester (1/2 unit of credit).

International Relations examines the political, economic, and social interactions in the post World War II era among the nations of Europe, Africa, Asia, Latin America, the Middle East, and North America. This course focuses on crisis points with attention to historical antecedents.

SS230 ANTHROPOLOGY/ARCHAEOLOGY. One semester (1/2 unit of credit).

This introductory course examines the origin, physical and cultural development of mankind, with particular emphasis on the evolution of social custom and belief along with the analysis of artifacts, architecture and related archaeological evidence. Instruction incorporates both current anthropological research and ongoing archaeological field work.

SS235 TOPICS IN HISTORICAL RESEARCH: VIETNAM. (One semester (1/2 unit of credit).

This course offers students the opportunity to pursue directed study on a significant theme or era to be selected annually. Instruction will incorporate extensive discussion and interaction with the entire NC-SSM social science faculty along with guest lecturers from the local university community.

SS240 HUMAN SEXUALITY. One semester (1/2 unit of credit).

This course is an integrated, interdisciplinary approach to basic biological and social science concepts of sexuality, including an explanation of the ways in which cultures both determine and reflect the differences in male and female roles.

SS245 INTRODUCTION TO PHILOSOPHY. One semester (1/2 unit of credit).

This course examines the nature of life for both the species in general and the individual in particular through a study of major philosophers. Problems studied include the nature and destiny of man, free will versus determinism, theories of knowledge, the nature of politics, ethical decision-making, loss of meaning and death. Students read selected works from classical philosophers such as Plato and Aristotle, through the existential writers, Sartre and Kierkegaard.

See also the following courses which grant credit in social sciences:

BI305 BIOETHICS. One semester (1/2 unit of credit; 1/4 each in biology and social science). See course description in Biology.

EN305 and 306 WISDOM, REVELATION, REASON, AND DOUBT. One-semester, one-credit courses for seniors. (1 unit of credit; 1/2 each in English and social science). See course description in English.

EN310 and 311 AFRICA, ASIA, LATIN AMERICA: LITERATURE AND HISTORY. one-semester, one-credit courses for seniors. (1 unit of credit; 1/2 each in English and social science). See course descriptions in English.

Music

Musical Performance: The following musical ensembles offer students the opportunity to study music through the medium of performance. Performance is seen not as an end in itself but as a means of developing an understanding of important ideas of music found in the repertoire of musical literature in a variety of historical periods and styles.

MU105 MIXED CHORUS. One semester (1/2 unit of credit); or one year (1 unit of credit).

Prerequisite: No previous musical experience necessary

MU107 CONCERT CHOIR/CHAMBER SINGERS. One semester (1/2 unit of credit) or one year (one unit of credit). An advanced choral performance group.

Prerequisite: Previous successful choral experience, audition and permission of the instructor

MU110 CONCERT BAND. One semester (1/2 unit of credit); or one year (1 unit of credit).

Prerequisite: Previous instrumental study or ensemble experience

MU115 ORCHESTRA. One semester (1/2 unit of credit); or one year (1 unit of credit).

Prerequisite for string players: Previous instrumental study

Prerequisite for woodwind, brass, and percussion players: Permission of instructor and previous band or orchestra experience

MU120 JAZZ ENSEMBLE. One semester (1/2 unit of credit) or one year (one unit of credit).

Prerequisite: Previous instrumental, keyboard or vocal performance experience; audition and permission of the instructor

Other Course Offerings

MU125 INTRODUCTION TO ELECTRONIC MUSIC. One semester (1/2 unit of credit).

Prerequisite: None; open to all students regardless of musical background

The purpose of this course is to provide an understanding of contemporary trends of electronic music through the media of musical performance, composition, and musical engineering. Although early electronic music was previously an experimental attempt to use new and unusual sounds, modern electronic music pervades the music industry of film scores, commercial music and popular styles. The course includes the development of basic knowledge and skills of synthesizer performance, audio engineering and musical composition and the study of the philosophical foundations of electronic music.

MU225 ADVANCED ELECTRONIC MUSIC. One semester (1/2 unit of credit).

Prerequisite: MU125 Introduction to Electronic Music or permission of the instructor

This course is essentially a continuation of MU125 Electronic Music 1, with particular emphasis on musical composition, the development of musical performance skills and the use of digital sequencers.

Media Center

Course Offering

MC105 VIDEO PRODUCTION. One Semester (1/2 unit of credit).

This course focuses on the main areas of production and post production: scripting/storyboarding, producing, editing. Students develop a technical vocabulary, learn to use the equipment and produce two video programs.

STUDY OPTIONS AND SPECIAL PROGRAMS

INDIVIDUALIZED STUDY

Prerequisite: Approval by the instructor of the course, department head, and Principal. Elective credit OR discipline graduation credit.

Individualized Study is a contract between student and teacher which allows a student to move at his or her own pace and style through a course offered in the regular curriculum.

Grading: A, B, C, D or S, U as established in the regular course.

INDEPENDENT STUDY

Prerequisite: Approval of sponsoring member of the faculty, department head, and Principal. Elective credit.

Independent Study is available to any student who wishes to explore a topic or area of interest not offered in the regular curriculum. The student and the instructor together design the program of study and determine the number and frequency of meetings and the amount of credit to be earned. This option is available in all disciplines with the scope of the program left to the discretion of the instructor.

Grading: A, B, C, D or S, U as established at time of registration

SEMINARS

Prerequisite: Approval of sponsoring member of the faculty, department head, and Principal. Elective credit.

Teams of three to eight students and a faculty sponsor meet at specified times to focus on a particular aspect of a discipline. Responsibility for reporting in sessions is shared interactively by students and sponsor.

Grading: A, B, C, D or S, U as established at time of registration.

ME105 MENTORSHIP PROGRAM. One year (1 unit of credit).

Prerequisite: Students planning a mentorship must register for the Mentorship Program (ME105) at the time of preregistration and have the approval of the Mentorship Coordinator. Elective credit.

Students spend three to five hours per week assisting professional researchers in area universities, institutions, and industries in the following fields: mathematics, science, engineering, and medicine. Pairing of researchers and students is arranged by a Mentor Program Coordinator who also monitors the plan and objectives of the students' participation. A periodic evaluation is completed jointly by the mentor, the student, and the coordinator.

Grading: A, B, C, D

PHYSICAL ACTIVITY AND WELLNESS

Every junior is required to participate in the Physical Activity and Wellness Program. This independent study course (PA105) is designed to promote healthy lifestyles through individual exercise programs and self-paced learning modules. Each student is required, both at the beginning of the junior year and at designated intervals throughout that year, to meet with the Physical Activity and Wellness instructor to design an appropriate program. The student's progress in this course, which is a graduation requirement, is evaluated with a grade each quarter. Every student must complete this course by the end of the junior year.

Course Offering

PA105 PHYSICAL ACTIVITY AND WELLNESS. One year (1/2 unit of credit). Required of all juniors. See paragraph above.

LIBRARY AND MEDIA CENTER

Extensive library and media facilities are available to students and faculty at the North Carolina School of Science and Mathematics. On-campus print and media collections are fortified by material available through interlibrary loans from area universities and North Carolina State libraries. Opportunities are provided to explore and use a wide variety of communications and information research tools, ranging from film and video to microfilms and computer-based information services. Students have opportunities for Work Service placement as library or media production aides.

RESIDENTIAL LIFE PROGRAMS

COMMUNITY SERVICE

As a graduation requirement, students must successfully complete sixty hours of Community Service work at an aproved agency in their home communities. Students may choose to meet this requirement by doing their Community Service work either the summer before entering NCSSM as a junior or the summer between the junior and senior years. It is hoped that the experience of volunteering will carry over into other aspects of students' lives and that they will continue to volunteer their energies and talents after they leave NCSSM.

WORK SERVICE

As a requirement for graduation, students must successfully complete four semesters of Work Service. Students are expected to be involved in one of many Work Service areas for three hours each week, in addition to one hour of hall housekeeping responsibilities. The Program is designed to meet the diverse needs of each participant and the needs of the school community.

MINIMUM GRADUATION REQUIREMENTS

Subject	Credits Earned at Previous School	Additional Credits Required by NCSSM	Total Number of Credits Required
English	2	2	4
Mathematics	2	2	4
Science	1	3	4
Social Science	1	1	2
Foreign Language	0	2	2
or	1	1	2
or	2	1	3
Physical Activity and Wellness	1	0.5	1.5
Electives	1	1.5	2.5
TOTAL	8	12	20

Satisfactory participation as indicated by a final report grade of "S" in Community Service and Work Service, a passing score on the annual statewide competency test, and demonstration of computer literacy are other requirements for graduation.

In addition to satisfactory completion of the above requirements, students are expected to exhibit responsible behavior toward other students, the school, the community, and the State as a condition of continuing enrollment and graduation.

Opportunities to develop and demonstrate responsible behavior are an integral part of the living/learning concept through work service, community service, and various residential life and independent study programs.

Students who do not meet standards of behavior as determined by the administration of the school or specifically stated in the *Student Handbook* may be required, after due process, to withdraw from the school. In such cases a diploma from the school will not be awarded to the student.

Special Notice

This catalog lists all of those courses which the School is prepared to offer. Since the total enrollment of the School is relatively small, it may not be possible to offer all courses every year. If the enrollment for a given course does not meet the minimum number required to justify faculty time, the course may be cancelled. In planning their course selections for elective courses, students should be prepared to consider alternative courses if their first choice is not available.

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